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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION N
10/683,676	10/09/2003	Theodore M. Taylor	108298732US	1814

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EXAMINER	
NGUYEN, GEORGE BINH MINH	
ART UNIT	**PAPER NUMBER**
3723	

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/683,676	**Applicant(s)** TAYLOR ET AL.	
	Examiner George Nguyen	**Art Unit** 3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) *7,8,19 and 20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,9-18 and 21-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *May 29, 2004*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Receipt is acknowledged of Applicant's election filed on September 29, 2004.

Claims 33-34 were canceled. Claims 7-8 and 19-20 were withdrawn from further consideration.

Receipt is acknowledged of the IDS filed on May 29, 2004 which has been considered and placed of record in the file.

Claims 1-6, 9-18, and 21-32 are presented for examination.

This application has been filed with formal drawings which are accepted to the examiner.

Election/Restrictions

1. Applicant's election without traverse of Group I, Species I of Figure 3 in the reply filed on September 29, 204 is acknowledged. Claims 33-34 were canceled. Claims 7-8 and 19-20 were withdrawn from further consideration.

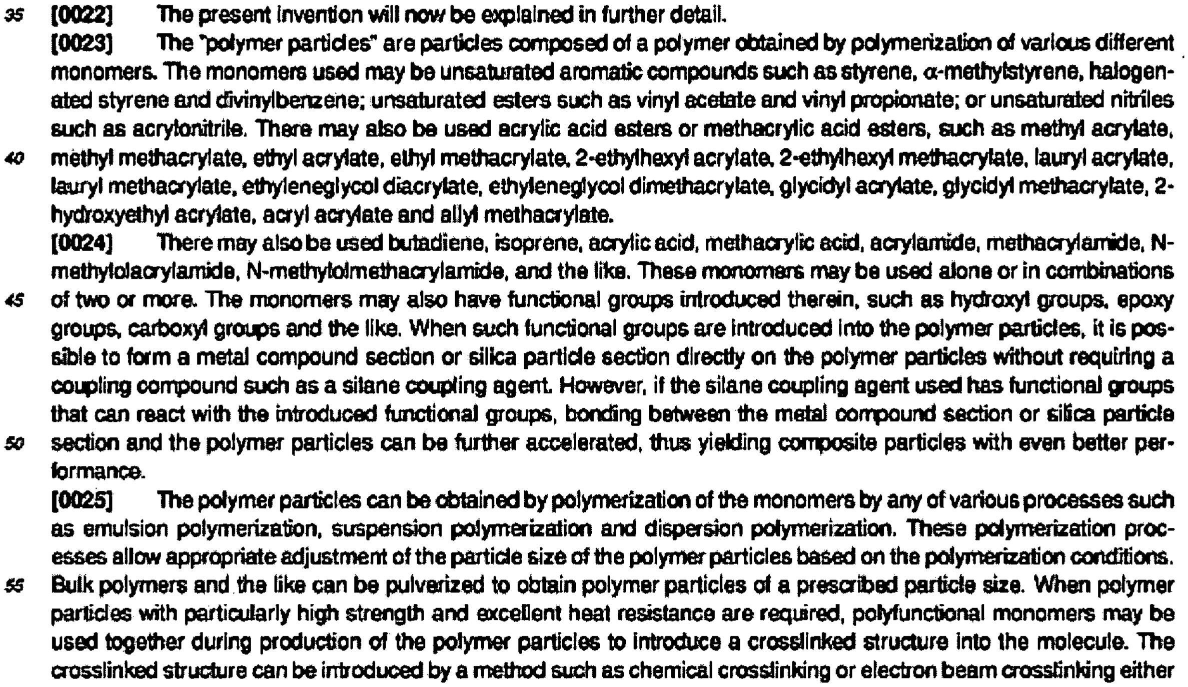
Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-6, 9-18, and 21-32 are rejected under 35 U.S.C. 102(b) as being anticipated by EP'1,020,488.

With reference to page 4, lines 35-59 EP'488 discloses the claimed invention.



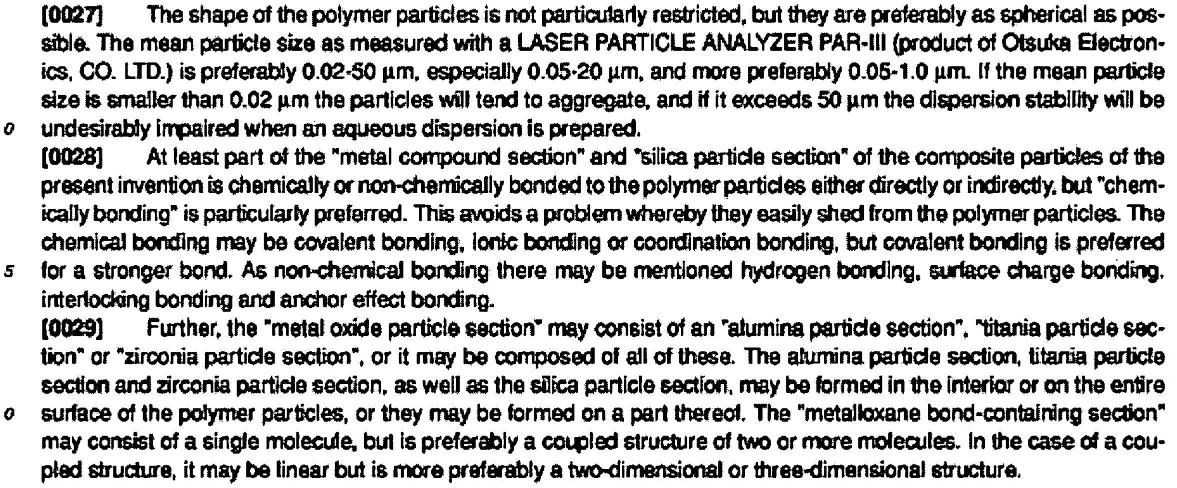
[0022] The present invention will now be explained in further detail.

[0023] The "polymer particles" are particles composed of a polymer obtained by polymerization of various different monomers. The monomers used may be unsaturated aromatic compounds such as styrene, α-methylstyrene, halogenated styrene and divinylbenzene; unsaturated esters such as vinyl acetate and vinyl propionate; or unsaturated nitriles such as acrylonitrile. There may also be used acrylic acid esters or methacrylic acid esters, such as methyl acrylate, methyl methacrylate, ethyl acrylate, ethyl methacrylate, 2-ethylhexyl acrylate, 2-ethylhexyl methacrylate, lauryl acrylate, lauryl methacrylate, ethyleneglycol diacrylate, ethyleneglycol dimethacrylate, glycidyl acrylate, glycidyl methacrylate, 2-hydroxyethyl acrylate, acryl acrylate and allyl methacrylate.

[0024] There may also be used butadiene, isoprene, acrylic acid, methacrylic acid, acrylamide, methacrylamide, N-methylolacrylamide, N-methylolmethacrylamide, and the like. These monomers may be used alone or in combinations of two or more. The monomers may also have functional groups introduced therein, such as hydroxyl groups, epoxy groups, carboxyl groups and the like. When such functional groups are introduced into the polymer particles, it is possible to form a metal compound section or silica particle section directly on the polymer particles without requiring a coupling compound such as a silane coupling agent. However, if the silane coupling agent used has functional groups that can react with the introduced functional groups, bonding between the metal compound section or silica particle section and the polymer particles can be further accelerated, thus yielding composite particles with even better performance.

[0025] The polymer particles can be obtained by polymerization of the monomers by any of various processes such as emulsion polymerization, suspension polymerization and dispersion polymerization. These polymerization processes allow appropriate adjustment of the particle size of the polymer particles based on the polymerization conditions. Bulk polymers and the like can be pulverized to obtain polymer particles of a prescribed particle size. When polymer particles with particularly high strength and excellent heat resistance are required, polyfunctional monomers may be used together during production of the polymer particles to introduce a crosslinked structure into the molecule. The crosslinked structure can be introduced by a method such as chemical crosslinking or electron beam crosslinking either

Page 5, lines 5-29, EP'488 further discloses:

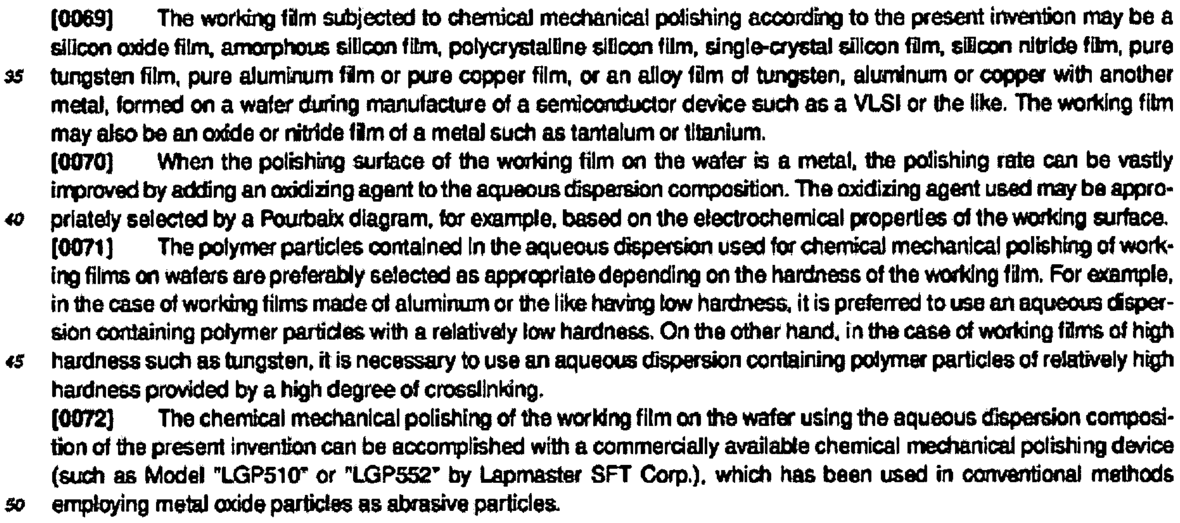


[0027] The shape of the polymer particles is not particularly restricted, but they are preferably as spherical as possible. The mean particle size as measured with a LASER PARTICLE ANALYZER PAR-III (product of Otsuka Electronics, CO. LTD.) is preferably 0.02-50 μm, especially 0.05-20 μm, and more preferably 0.05-1.0 μm. If the mean particle size is smaller than 0.02 μm the particles will tend to aggregate, and if it exceeds 50 μm the dispersion stability will be undesirably impaired when an aqueous dispersion is prepared.

[0028] At least part of the "metal compound section" and "silica particle section" of the composite particles of the present invention is chemically or non-chemically bonded to the polymer particles either directly or indirectly, but "chemically bonding" is particularly preferred. This avoids a problem whereby they easily shed from the polymer particles. The chemical bonding may be covalent bonding, ionic bonding or coordination bonding, but covalent bonding is preferred for a stronger bond. As non-chemical bonding there may be mentioned hydrogen bonding, surface charge bonding, interlocking bonding and anchor effect bonding.

[0029] Further, the "metal oxide particle section" may consist of an "alumina particle section", "titania particle section" or "zirconia particle section", or it may be composed of all of these. The alumina particle section, titania particle section and zirconia particle section, as well as the silica particle section, may be formed in the interior or on the entire surface of the polymer particles, or they may be formed on a part thereof. The "metalloxane bond-containing section" may consist of a single molecule, but is preferably a coupled structure of two or more molecules. In the case of a coupled structure, it may be linear but is more preferably a two-dimensional or three-dimensional structure.

Page 9, lines 33-59, EP'488 further discloses:



[0069] The working film subjected to chemical mechanical polishing according to the present invention may be a silicon oxide film, amorphous silicon film, polycrystalline silicon film, single-crystal silicon film, silicon nitride film, pure tungsten film, pure aluminum film or pure copper film, or an alloy film of tungsten, aluminum or copper with another metal, formed on a wafer during manufacture of a semiconductor device such as a VLSI or the like. The working film may also be an oxide or nitride film of a metal such as tantalum or titanium.

[0070] When the polishing surface of the working film on the wafer is a metal, the polishing rate can be vastly improved by adding an oxidizing agent to the aqueous dispersion composition. The oxidizing agent used may be appropriately selected by a Pourbaix diagram, for example, based on the electrochemical properties of the working surface.

[0071] The polymer particles contained in the aqueous dispersion used for chemical mechanical polishing of working films on wafers are preferably selected as appropriate depending on the hardness of the working film. For example, in the case of working films made of aluminum or the like having low hardness, it is preferred to use an aqueous dispersion containing polymer particles with a relatively low hardness. On the other hand, in the case of working films of high hardness such as tungsten, it is necessary to use an aqueous dispersion containing polymer particles of relatively high hardness provided by a high degree of crosslinking.

[0072] The chemical mechanical polishing of the working film on the wafer using the aqueous dispersion composition of the present invention can be accomplished with a commercially available chemical mechanical polishing device (such as Model "LGP510" or "LGP552" by Lapmaster SFT Corp.), which has been used in conventional methods employing metal oxide particles as abrasive particles.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yano et al.'590 discloses aqueous dispersion containing polymers particles and embedded alumina, silica, or the like particles. Cho et al.'725, Kodate'416, Nagata et al.'185, and Iler'863 all disclose composite abrasive particles.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Nguyen whose telephone number is 703-308-0163. The examiner can normally be reached on Monday-Friday/630AM-300PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on 703-308-2687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

George Nguyen
Primary Examiner
Art Unit 3723

GEORGE NGUYEN
PRIMARY EXAMINER

GN – October 14, 2004